✓ M [redacted]

80286/80386SX-BASED DESKTOP COMPUTER

Model H-5100

ASSEMBLY 595-4696

Copyright © 1990
Heath Company
All Rights Reserved
Printed in the United States of America

HEATH COMPANY
BENTON HARBOR, MICHIGAN 49022

Table of Contents

INTRODUCTION III

ASSEMBLY NOTES IV

PARTS LIST 1-1

CHASSIS ASSEMBLY 2-1
Installing SIMMs 2-2
Removing SIMMs 2-2
Expanding Memory 2-2
Main Board Installation 2-2
Numeric Coprocessor Installation 2-3
Paddle Card Installation 2-4
Winchester Installation 2-5
Floppy Drive Installation 2-5
Second Floppy Drive Installation 2-6
Cover Plate Installation 2-7

DIAGNOSTIC TESTS 3-1
Initial Tests 3-1
Disk-Based Diagnostics 3-4
Winchester Drive Tests 3-5
Test Summary 3-7

FINAL ASSEMBLY 4-1
Special Shipping Instructions 4-2

WARRANTY . . . . Inside front cover

CUSTOMER SERVICE . . . . Inside rear cover

INTRODUCTION

The Heathkit 80286/80386SX-Based Desktop Computer, Model H-5100, is a true 16-bit advanced technology computer. For increased arithmetic processing, you may also install one of two numeric coprocessor options.

The CPU and coprocessor sockets are located on smaller circuit boards called paddle cards. These allow you to easily upgrade your Computer from an 80286 microprocessor to an 80386SX-based computer, for future growth and expansion.

Your Computer comes standard with 1M of RAM consisting of four 256K SIMMs (Single Integrated Memory Modules), which are located on the main board. You can increase the memory on this board to 5M by installing four optional 1M SIMMs in the empty memory sockets. To increase the memory to the maximum of 8M, you must remove the four 256K SIMMs and install eight optional 1M SIMMs.

The memory expansion feature is combined with a hardware implementation of the Lotus-Intel-Microsoft Expanded Memory Specification (EMS), which is a method of using applications that require more than the 640K memory limit of MS-DOS. For software that is written to take advantage of EMS, this system makes available up to 7M of memory, which is transparent to the user.

For I/O (Input/Output) use, the main board contains a Centronics-type parallel port and two 9-pin RS-232C serial ports for a variety of peripherals.

This Computer can support up to two floppy disk drives and one Winchester drive. One 3-1/2", 1.4M floppy disk drive comes standard with the Computer.

A switching-type, regulated power supply provides plenty of reserve power for accommodating up to the maximum of 8M of memory and optional disk drives.

ROM-based diagnostics are performed each time you apply power so you will always know the status of your Computer. A more comprehensive disk-based diagnostics package is also provided so you can easily confirm the viability of any part of your Computer throughout its life.

A single 31 kHz VGA video port is provided on the main circuit board, leaving all five expansion slots available for options. Accessories that you can add to the basic single-floppy-disk-drive computer include:

- A 3-1/2" 40M winchester drive, Model HWD-4011.
- A 3-1/2" 1.4M floppy-disk drive, Model ZD-144.
- A 5-1/4" 1.2M floppy-disk drive, Model ZD-12.
- A 5-1/4" 360K floppy-disk drive, Model Z-207-7.
- 2M of RAM (two 1M SIMMs) with the Model ZCA-2300-MG memory expansion.
- A 31 kHz monochrome monitor, Model ZMM-149-A (amber screen) or Model ZMM-149-P (page white screen).
- A 31 kHz color monitor, Model ZCM-1390.
- A 31 kHz flat technology monitor, Model ZCM-1492.
- An 80287 numeric coprocessor, Model Z-416-2 (for 80286-based Computer).
- An 80387SX numeric coprocessor, Model ZA-3700-CI (for 80386SX-based Computer).
- A dual-port video card that supports VGA monitors or EGA, CGA, MDA, or Hercules monitors, Model HVB-550.

ASSEMBLY NOTES

TOOLS

The tools you will need to assemble your Computer are: a small (#1) Phillips screwdriver, a 1/4" flat-blade screwdriver, a 3/16" and a 1/4" nut driver.

#1 PHILLIPS
SCREWDRIVER

1/4" FLAT-BLADE
SCREWDRIVER

3/16" & 1/4"
NUT DRIVERS

ASSEMBLY

1. Follow the instructions carefully. Read the entire step before you perform each operation.

2. Refer to the separate "Illustration Booklet" for the Pictorials and Details, and keep it with the Assembly Manual. The illustrations in it are arranged in the proper sequence, as called for in the assembly steps.

3. Pictorials show the overall operation for a group of steps; Details generally illustrate a single step. When you are directed to refer to a certain Pictorial "for the following steps," continue using that Pictorial until you are referred to another Pictorial for the next group of steps.

4. Position all parts as shown in the Pictorials.

5. Use a piece of heavy cardboard or indoor-outdoor carpet to protect your work surface and the Computer from dents or scratches.

PARTS LIST

Check each part against the following list and the "Parts Pictorial" (Illustration Booklet, Page 1). The key numbers correspond to the numbers on the "Parts Pictorial." Return any part that is in an individual envelope, with the part number on it, back into its envelope until that part is called for in a step. Do not throw away any packing material until you account for all of the parts.

CAUTION: Static electricity can damage sensitive electronic components. Before you remove and handle any of the static-sensitive drives or circuit board assemblies which are packed in protective packaging, make sure you discharge any static electricity that may have built up in your body. To do this, touch your hand to a well-grounded source, such as a metal cabinet, for several seconds to allow any built-up electrical charge to flow from your body to ground.

NOTE: Save all of the circuit board and disk drive packaging in case it ever becomes necessary to return the Computer, or any part of it, to the factory for service.

To order a replacement part, always include the PART NUMBER. Use the Parts Order Form furnished with this kit. If a Parts Order Form is not available, refer to "Replacement Parts" inside the rear cover of this Manual.

ELECTRONIC ASSEMBLIES

KEY No.	HEATH Part No.	QTY.	DESCRIPTION
A1	151-1088	1	Floppy disk drive
A2	163-40-4*	1	Keyboard
A3	181-7689	1	Keyboard interface board
	240-7878	1	Main (planar) board
	181-7910	1	Backplane board
A4	234-1135	1	Power supply
A5	443-1535-1	4	SIMM

SHEET METAL PARTS

KEY No.	HEATH Part No.	QTY.	DESCRIPTION
B1	90-1414	1	Cover
B2	200-1645	1	Chassis
B3	204-2721	5	Cover plate
B4	204-3403	1	Left drive/cover plate bracket
B5	205-2098	1	Bottom cover
B6	205-2112	1	3-1/2" drive cover plate

HARDWARE

NOTE: The hardware is shown full size so you can place any nut, screw, etc. that you have difficulty identifying over the drawing. Also, the hardware may be packed in more than one envelope. Open all of the hardware envelopes (marked HDW) before you check the hardware against the following Parts List.

No part number on
SIMM envelope (173-5445)
or on SIMM bag. Doesnot match
illustration.

#4 Hardware

KEY No.	HEATH Part No.	QTY.	DESCRIPTION
C1	250-1408	2	#4 x 3/8" sheet metal screw
C2	254-9	8	#4 lockwasher 9 received
C3	255-757	8	4-40 hex spacer

#6 Hardware

KEY No.	HEATH Part No.	QTY.	DESCRIPTION
C4	250-1538	27	6-32 x 1/4" screw
C5	250-365	3	#6 x 1/4" sheet metal screw
C6	250-1556	8	#6 x 3/8" self-tapping screw
C7	250-1650	2	6-32 thumb screw

Other Hardware

KEY No.	HEATH Part No.	QTY.	DESCRIPTION
C8	810-16	2	M3 x 5 mm screw
C9	810-15	2	M3 x 5 mm flat-head screw
C10	255-914	1	6-32 x 1/2" hex spacer

CABLES

KEY No.	HEATH Part No.	QTY.	DESCRIPTION
	89-65	1	Line cord
	134-2231	1	34-conductor cable
D1	134-2353	1	Speaker/LED/switch assembly

---

* This part may be marked 163-56.

PLASTIC PARTS

KEY No.	HEATH Part No.	QTY.	DESCRIPTION
E1	203-2437	1	5-1/4" cover
E2	210-155	1	Front bezel
E3	266-1296	1	Drive guide
E4	266-1305	1	Card guide
E5	266-1301	1	Speaker retainer
E6	438-88	1	Nameplate retainer

MISCELLANEOUS

KEY No.	HEATH Part No.	QTY.	DESCRIPTION
F1	74-56	4	1" x 1-1/2" double-stick tape
F2	258-797	1	Coil spring
F3	258-801	1	Chassis spring
F4	258-814	1	Ground clip
F5	261-76	4	Round foot
F6	261-49	1	Square foot
F7	390-3530	2	ICON label
F8	390-3797	1	Warning/ID label
F9		1	Blue and white label
F10	391-671	1	Keyboard label
~~F11~~	~~391-757~~	~~1~~	~~Model nameplate~~ N/S
F12	418-72	1	6-volt lithium battery
F13	432-1336	1	Jumper block
F14	462-1280	1	Power button

PRINTED MATERIALS

KEY No.	HEATH Part No.	QTY.	DESCRIPTION
	597-260	1	Parts Order Form*
	597-1656-7	1	HUG application*
		1	Owner's Manual (see Page 1 for the part number)
		1	Assembly Manual (see Page 1 for the part number)

BINDER PARTS**

KEY No.	HEATH Part No.	QTY.	DESCRIPTION
G1	485-70	4	Binder fastener
	597-4460-1	1	Large binder cover
	597-4462-2	1	Small binder cover
	701-233	1	Large 3-ring binder
	701-235	1	Small 3-ring binder

** These items are used to make up the Assembly Manual.

* These parts may be packed inside the Assembly Manual.

CHASSIS ASSEMBLY

Refer to Pictorial 1-1 while you perform the following steps.

(✓) Position the chassis upside down on your work surface as shown in the Pictorial.

(✓) Carefully peel away the backing paper from one side of a 1" x 1-1/2" piece of double-stick tape. Then press the tape onto the bottom of the chassis near one corner as shown.

(✓) Similarly install pieces of double-stick tape near the other three chassis corners.

(✓) Locate the bottom cover. Then use the following procedure to mount the cover to the chassis:

1. Temporarily position the bottom cover on the chassis bottom (painted or vinyl side up). Note that it matches the shape of the chassis only one way.
2. Carefully peel away the remaining backing paper from the four pieces of double-stick tape. Then align the bottom cover with the chassis and press it into place. NOTE: Be sure to install the cover correctly, it is hard to remove once it has been pressed into place.

NOTE: Decide whether you will use the Computer with it positioned horizontally or vertically. If you will use it in a horizontal position, install the feet as directed in the next step. If you will use it in a vertical position, skip the next two steps; the feet will be installed on the cabinet top later.

(✓) Carefully peel away the backing paper from one of the feet. Then press the foot onto the bottom cover near one corner as shown.

(✓) Similarly install feet near the other three corners of bottom cover.

( ) Set the chassis aside.

Refer to Pictorial 1-2 while you perform the following steps.

CAUTION: Static electricity can damage sensitive electronic components. Before you remove and handle any of the static-sensitive drives or circuit board assemblies which are packed in protective packaging, make sure you discharge any static electricity that may have built up in your body. To do this, touch your hand to a well-grounded source, such as a metal cabinet, for several seconds to allow any built-up electrical charge to flow from your body to ground.

(✓) Remove the main (planar) board (#240-7878) and lay it on top of its bag.

Your Computer was shipped from the factory with four 256K SIMMs that must be installed on the main board at locations MM501, MM502, MM503, and MM504 as shown in Detail 1-2A.

Due to the limitations of many operating systems, like MS-DOS, the Computer cannot access more than 640K of base memory. Some applications programs, however, are written to recognize and use memory above 640K. If you have a program that uses additional memory, you may wish to upgrade the memory of your Computer. You can expand the RAM in your Computer to either 3M, 5M or 8M, by installing two 1M SIMMs at a time. If your software does not use EMS or extended memory, any additional memory you install will be unused. Check your software documentation before you proceed.

CAUTION: Like any other memory device, SIMMs are sensitive to static electricity. Do not remove a SIMM from its packaging until you are ready to install it. Before you pick up the SIMM, equalize the static electricity between your work surface and the SIMM by touching the work surface with one hand and then picking up the SIMM with the other. After you remove the SIMM from its packaging, do not set it down or let go of it until it is either installed in the main board or returned to its protective packaging.

(✓) Before you remove or install SIMMs, refer to Detail 1-2A and note the location of the eight memory sockets at MM501, MM502, MM503, MM504, MM505, MM506, MM507, and MM508 on the main board.

INSTALLING SIMMS

Refer to Detail 1-2B and use the following procedure to install SIMMs:

NOTE: Due to the angle in which a SIMM must be positioned to insert it, you must fill the memory sockets sequentially from left to right. For example, install a SIMM in MM505 only after sockets MM501, MM502, MM503, and MM504 are filled.

(✓) Position the SIMM so the edge connector is over the socket and the side with the memory devices faces toward the left.

(✓) Tip the SIMM at a slight angle toward the right and guide it into its socket. Then gently push it to its upright position. You should hear a click as the tabs at the end of the socket snap into the holes in the ends of the SIMM. **Never force a SIMM into its socket.**

REMOVING SIMMS

Refer to the inset drawing on Detail 1-2B and use the following procedure to remove a SIMM:

( ) Use a small flat-blade screwdriver to push back on the tabs at the ends of the module socket so that the holes in the SIMM can clear the bracket tabs.

( ) Gently tip the SIMM toward the right and lift it from the socket.

NOTE:If you have purchased additional SIMMs, complete the applicable step under "Expanding Memory". Otherwise, proceed to "Main Board Installation".

EXPANDING MEMORY

Not [illegible]

( ) To increase the memory to 3M, install two 1M SIMMs at MM505 and MM506. Be sure to install the SIMMs as shown in Detail 1-2B.

( ) To increase the memory to 5M, install 1M SIMMs at MM505, MM506, MM507, and MM508. Be sure to install the SIMMs as shown in Detail 1-2B.

( ) To increase the memory to 8M (maximum), first remove the four 256K SIMMs from MM501, MM502, MM503, and MM504. Then install 1M SIMMs at MM501, MM502, MM503, MM504, MM505, MM506, MM507, and MM508.

MAIN BOARD INSTALLATION

Refer to Pictorial 1-3 while you perform the following steps.

(✓) Position the chassis as shown in the Pictorial.

(✓) Carefully peel away the backing paper from the square foot. Then press the foot onto the chassis at the indicated location.

(✓) Use a 6-32 x 1/4" screw to mount the 6-32 x 1/2" spacer to the main board at the indicated location. Do not overtighten the screw, or you could strip the threads in the spacer.

(✓) Set the main board into the chassis so it rests on the five mounting spacers on the bottom of the chassis and the four sockets extend through their holes in the rear of the chassis. Then use eight 4-40 hex spacers and eight #4 lockwashers to loosely mount the main board to the rear panel. Do not tighten these spacers yet.

(✓) Use four 6-32 x 1/4" screws to secure the main board to the bottom of the chassis at CA, CB, CC, and CD. You will secure the board to the chassis at CE later.

(✓) Tighten the eight 4-40 hex spacers on the rear of the chassis. **Do not** overtighten these spacers; they break easily.

(✓) Refer to Detail 1-3A and use #4 hardware ~~three #6 x 1/4" sheet metal screws~~ to mount the chassis spring to the chassis partition as shown.

(✓) Locate the card guide. Then refer again to Detail 1-3A and position it with its small tab downward. Start the round bosses into the front panel holes and push it toward the right side of the chassis until the small tab locks the guide into place.

Refer to Pictorial 1-4 while you perform the following steps.

(✓) Line up the backplane board's edge connectors with main board sockets P508 and P509. Then push the backplane board firmly down into the sockets. Use two 6-32 x 1/4" screws to secure the top of the backplane board to the chassis partition.

If you purchased a numeric coprocessor, complete the applicable steps under "Numeric Coprocessor Installation". Otherwise, proceed to "Paddle Card Installation" on Page 2-4.

NUMERIC COPROCESSOR INSTALLATION

The 80287 or 80387SX numeric coprocessor is an integrated circuit (IC) that you install in an empty socket on the paddle card. Perform the applicable group of steps, depending upon which paddle card you have.

80387SX Coprocessor (80386SX Paddle Card)

The numeric coprocessor is an MOS (Metal Oxide Semiconductor) device. It is a rugged and reliable component once it is installed, but it can be damaged by static electricity as you install it. Use the procedure described below when you install the IC to protect it from static electricity.

( ) Remove the paddle card and position it on top of its bag as shown in Detail 1-4A. Note the location of the arrow or triangle on socket U012.

NOTES:

1. After you pick up the numeric coprocessor, do not let go of it until it is installed in its socket.
2. Be sure to install the numeric coprocessor correctly in its socket; it is almost impossible to remove without using a special tool.

( ) Carefully unpack the numeric coprocessor and hold it in one hand while you touch the paddle card with your other hand.

( ) Note that the IC has a dot near one corner or along one side. Match this dot with the arrow or triangle on socket U012. Then carefully push the IC as far as possible into its socket. NOTE: IC will be a tight fit in socket.

Proceed directly to "Paddle Card Installation".

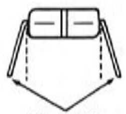
80287 Coprocessor (80286 Paddle Card)

The numeric coprocessor is an MOS (Metal Oxide Semiconductor) device. It is a rugged and reliable component once it is installed, but it can be damaged by static electricity as you install it. Use the procedure described below when you install the IC to protect it from static electricity.

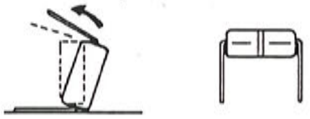
( ) Remove the paddle card and position it on top of its bag as shown in Detail 1-4B. Note the location of socket U203.

( ) Remove the IC from its conductive foam pad, but **do not let go of it until it is installed in its socket.** Hold the IC in one hand and place your other hand on your work surface before you touch the IC to your work surface. This will equalize the static electricity between the work surface and the IC.

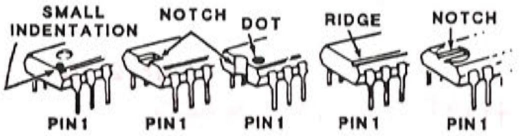
NOTE: The pins on the IC may be bent out at an angle as shown below and thus will not line up with the holes in socket U012. Do not try to install the IC without first bending the pins as described below or you may damage the pins or the socket.



( ) If necessary, very carefully roll the IC toward the pins to bend the lower pins into line. Then turn the IC over and bend the pins on the other side in the same way.



( ) Compare the IC to the drawings below and determine which end of the IC is the pin 1 end.



( ) Hold the IC in one hand and the paddle card in the other. Then position the pin 1 end of the IC over the index mark on the card and start the pins into the socket. Make sure that all of the pins are started and then push the IC down firmly.

PADDLE CARD INSTALLATION

(✓) Position the paddle card upside-down above the main board, as shown in Detail 1-4C, so the 99-pin plug is aligned with the 99-pin socket on the main board. Then carefully plug the two together. Use a 6-32 x 1/4" screw to mount the indicated corner of the paddle card to the spacer that is mounted on the main board. Do not overtighten the screw or you could strip the threads in the spacer.

Refer to Pictorial 1-5 while you perform the following steps.

(✓) Reposition the chassis assembly as shown in the Pictorial.

(✓) Refer to Detail 1-5A and use two 6-32 x 1/4" screws to mount the ground clip and the keyboard interface board to the rear panel. Be sure to position the ground clip so the curved portion is away from the inside of the rear panel as shown. Also, center the keyboard socket in the panel hole before you tighten the screws.

(✓) Push the socket on the end of the cable coming from the keyboard interface board onto plug P515 on the main circuit board. NOTE: This connector is keyed to fit only the correct way.

(✓) Use a 6-32 x 1/4" screw to secure the main board, and lug on the free end of the black wire coming from the keyboard interface board, to the chassis at CE. Be sure to position the ground lug as shown before you tighten the screw.

WARNING: The lithium battery can cause a fire, explosion or severe burns. Do not short circuit, attempt to charge, disassemble, or crush the battery or heat it above 72°C (162°F) or it may leak or explode.

(✓) Refer to Detail 1-5B and remove the backing from the lithium battery's Velcro™ strip. Position the battery as shown in the Pictorial and press the adhesive side of the Velcro strip against the inside of the front panel at the indicated location.

(✓) Push the socket on the free end of the wires coming from the battery onto main board plug P513. The socket and plug are polarized so you can connect them only the correct way.

(✓) Neatly coil ~~up~~ the excess battery wires and position them between the battery and the bottom of the chassis.

(✓) Locate the speaker/LED/switch assembly.

NOTE: In the following steps, handle the speaker carefully to avoid damaging its fragile cone.

( ) Refer to Detail 1-5C Parts A and B and start the retainer over the speaker as shown. Then turn the assembly over and carefully push the speaker all the way into the retainer.

(✓) Refer to Detail 1-5D and carefully push the LED holder (with LED installed) into front panel hole FA until it locks into place.

(✓) Refer to Detail 1-5E and use two #4 x 3/8" sheet metal screws to mount the pushbutton switch to the front panel as shown. Be sure to position the switch so the wires are toward the chassis partition.

( ) Refer to Detail 1-5F and use a #6 x 3/8" ~~sheet metal~~ self-tapping screw to mount the speaker/retainer assembly to the indicated side of the chassis partition. Be careful that you do not pinch any wires under the retainer.

( ) Push the 6-pin socket on the free end of the wires coming from the speaker/LED/switch assembly onto plug P512 on the main board. These connectors are keyed to fit only the correct way.

( ) Route the socket on the free end of the remaining wires coming from the speaker/LED/switch assembly toward the rear panel as shown; it will be connected later.

Refer to Pictorial 1-6 while you perform the following steps.

CAUTION: Floppy and Winchester disk drives are precision devices that can be damaged by rough handling. Handle all drives only by their frames, and with special care. Use the same care when you handle the Computer after a drive has been installed.

If you have purchased a Winchester drive, proceed to the steps under "Winchester Installation". Otherwise, proceed to "Floppy Drive Installation".

WINCHESTER INSTALLATION

( ) Carefully unpack the Winchester drive and set it on top of its bag with the component side up and the 40-pin plug toward the right, as shown in Detail 1-6A.

( ) Refer again to Detail 1-6A and use two 6-32 x 3/16" screws (supplied with the drive) to mount the support bracket to the indicated side of the drive.

( ) Refer to Detail 1-6B and slide the drive as far as possible into the bottom slot of the drive housing. Then use two 6-32 x 3/16" screws (supplied with the drive) to secure the drive to the housing.

( ) Locate the ribbon cable that was supplied with the Winchester drive. Position the cable as shown in ~~Part A of~~ the Pictorial and carefully push the socket on the indicated end of the cable onto the 40-pin plug on the Winchester drive. Be sure to position the marked edge of the cable as shown.

( ) Route the free end of the ribbon cable as shown and push the socket on the free end of the cable onto main board plug P511. Be sure to position the marked edge of the cable as shown.

FLOPPY DRIVE INSTALLATION

( ) Carefully remove the floppy disk drive from its packaging. Do not remove the protective insert (if any) from the drive until you are directed to do so.

NOTE: Perform only Step #1 or Step #2, depending upon which type of floppy disk drive you have.

1. ( ) If your drive has a drive select switch on its right side, as shown in Detail 1-6C, place the switch in the "1" (DS1) position, if this has not already been done.

2. ( ) If your drive has a drive select jumper as shown in Detail 1-6D, move the jumper to position 1 (DS1), if it is not already in this position.

( ) Refer to Detail 1-6E and use two M3 x 5 mm flathead screws to mount a drive guide to the left side of the floppy drive as shown.

( ) Refer to Detail 1-6F and slide the floppy drive into the top slot of the drive housing. Then use two M3 x 5 mm screws to secure the drive to the drive housing. Push the drive as far as possible into the housing before you tighten the screws. NOTE: There may or may not be a drive in the bottom slot of the drive housing, depending upon whether or not you installed a Winchester drive.

Refer to Pictorial 1-7 while you perform the following steps.

(✓) Locate the 34-conductor cable and position it with the larger connector up, as shown in the Pictorial. Then carefully push the second socket (if you have only one floppy disk drive) or refer to the inset drawing and push the third socket (if you have two floppy disk drives) onto the 34-pin plug on the drive. Be sure to position the marked edge of the cable as shown.

(✓) Carefully push the socket on the other end of the cable onto main board plug P510. Be sure to position the marked edge as shown.

Refer to Pictorial 1-8 while you perform the following steps.

(✓) Position the power supply inside the chassis as shown in Detail 1-8A. Then use two 6-32 x 1/4" screws to loosely mount the two front mounting flanges of the power supply to the chassis bottom at CJ and CK. Use four 6-32 x 1/4" screws to secure the power supply to the rear panel. Now tighten the screws at CJ and CK.

NOTE: The connectors referred to in the next four steps are polarized so you can connect them only the correct way.

(✓) If you installed a Winchester drive in your Computer, push plug P2 into its corresponding socket on the drive.

(✓) Push socket P4 onto its corresponding plug on the floppy disk drive.

(✓) Push socket P1 onto main board plug P514.

(✓) Locate the free end of the cable coming from the speaker/LED/switch assembly. Then push this socket onto the 3-pin plug on the side of the power supply.

NOTE: Perform the steps under "Second Floppy Drive Installation" only if you have an additional floppy disk drive. Otherwise skip these steps and proceed directly to "Cover Plate Installation".

SECOND FLOPPY DRIVE INSTALLATION

Refer to Pictorial 1-9 while you perform the following steps.

( ) Carefully unpack the **optional** floppy disk drive that you ordered with your kit. This may be a Model ZD-12, Z-207-7, or ZD-144 drive. NOTE: Do not remove the protective insert, if installed, from the drive until you are instructed to do so.

( ) Write the manufacturer's name and model number for your particular drive in the following blanks. You will need this information if you have to refer to the model number of your drive for some reason.

Manufacturer's Name MATSUSHITI DDFS-27A

Model Number ZD-12 1.2 MB

NOTES:

A. Complete the next three numbered steps only if your optional drive is a 3-1/2" drive, Model ZD-144.

B. Perform only step 1A or 1B, depending upon which type of floppy disk drive you have.

( ) 1A. If your drive has a drive select switch on its right side, as shown in Detail 1-9A, place the switch in the "1" (DS1) position, if this has not already been done.

1B. If your drive has a drive select jumper, as shown in Detail 1-9B, move the jumper to position 1 (DS1), if this has not already been done.

( ) 2. Refer to Detail 1-9C and install grommets in holes DC and DD of the drive adaptor bracket.

( ) 3. Refer again to Detail 1-9C and carefully set the drive into the drive adaptor bracket as shown. Then secure the drive to the bracket with an M3 x 8 mm screw at DA and DB. Use an M3 x 8 mm screw and a #4 (small) flat washer at DC and DD.

( ) Refer to Detail 1-9D and use the hardware supplied to loosely mount the left drive/cover plate bracket to the side of the optional floppy drive.

( ) Set the drive onto the top of the drive housing.

( ) Use the screws supplied with the drive to mount it to the drive housing. Line up the front of this drive with the front of the previously-installed drive before you tighten the screws. NOTE: You can gain access to the screws on the left side of the drive through the slots in the chassis partition on each side of the speaker. Be careful not to puncture the speaker with your screwdriver.

( ) Use two 6-32 x 1/4" screws to secure the left drive/cover plate bracket to the front panel.

If your **optional** floppy disk drive is a 360K 5-1/4" drive, Model Z-207-7, refer to Detail 1-9E and perform the following two numbered steps.

( ) 1. Examine the drive installed on the top of the drive housing. Then determine which drive type shown in Detail 1-~~8~~9F most resembles your optional drive.

artwork and steps don't appear

If your optional drive resembles Drive Type A or B, move the programming jumper to **DS1**, if this has not already been done.

If your optional drive resembles Drive Type C, D, or E, move the programming jumper(s) to **DS** and **2**, or **2DS**, if this has not already been done.

( ) 2. Again refer to the part of Detail 1-9E that corresponds to your optional drive and cut the foil trace or wire jumper for pin 34, **or** remove the jumper socket in series with the foil trace coming from pin 34, of the drive edge connector, if this has not already been done.

If your **optional** floppy disk drive is a 1.2M 5-1/4" drive, Model ZD-12, perform the following step.

( ) 1. Refer to the part of Detail 1-9F that corresponds to your drive and check the programming jumpers to make sure the jumper sockets are positioned as shown. If they are not, move them to the proper locations. NOTE: You may have some leftover jumpers.

( ) Determine which socket on the end of the 34-conductor cable matches the plug on your drive. Then push the socket onto the plug. Be sure to position the marked edge of the cable as shown.

( ) Refer to the Owner's Manual (Page 4-9) and install a jumper block at J511 on the main board in the "ON" position.

( ) Connect power supply plug P3 to the power socket on the disk drive that is mounted on top of the drive housing, as shown in inset drawing #1 on Pictoral 1-8, if you have a Model ZD-12 or ZD-207-7 drive. NOTE: If your optional drive is a 3-1/2" drive, Model ZD-144, connect the power adaptor (supplied with the drive) between power supply plug P3 and the power socket on the disk drive, as shown in inset drawing #2.

COVER PLATE INSTALLATION

Refer to Pictorial 1-10 while you perform the following steps.

( ) Locate the 3-1/2" drive cover plate and use the following procedure to mount it to the chassis:

1. Position the cover plate with its rectangular slot as shown.
2. Use two 6-32 x 1/4" screws to mount the cover plate onto the front of the chassis.

( ) If you did not mount a second floppy drive on top of the drive housing, use a 6-32 x 1/4" screw to mount the left drive/cover plate bracket to the front of the chassis as shown.

( ) Push the power button onto the ON/OFF switch as shown.

NA ( ) If you have an optional video card, install it in one of the backplane slots at this time.

This completes the "Chassis Assembly". Proceed to "Diagnostic Tests".

1hr 45 min

DIAGNOSTIC TESTS

In the following steps, you will make sure your Computer operates properly. Perform each test carefully.

NOTES:

1. If you turn the Computer off during these tests, wait at least 20 seconds before you turn it back on. The power supply capacity is such that it takes 20 seconds for all voltages to drop low enough to ensure that a power-on reset will occur when power is reapplied.
2. The power indicator is a 2-color LED. Green indicates that the power is on, while orange indicates that the Winchester drive (if one is installed) is in use.

INITIAL TESTS

Refer to Pictorials 2-1 and 2-2 while you perform the following steps.

(✓) Set the power switch on the front of the Computer to its off (out) position, if this has not already been done.

NOTE: The line cord supplied with your kit is **not** suitable for 230 VAC. For 230 VAC operation, you must replace it with a cord that is approved for 230 VAC use.

(✓) Connect the line cord to the Computer but do not connect it to an AC outlet yet.

(✓) Refer to the inset drawing on Pictorial 2-2 and slide the keyboard AT/XT switch to its AT position, if this has not already been done.

(✓) Match the pins on the end of the keyboard cable with the keyboard connector on the rear panel of the Computer. Then insert the plug into the socket.

(✓) Use an appropriate cable (not supplied) to connect your VGA video monitor to the VIDEO connector on the rear panel. NOTE: If you installed an optional video board, connect your TTL monitor (EGA, CGA, MDA, or Hercules) to this optional video card. Refer to the "Owner's Manual" for more information about the rear panel connectors.

(✓) Connect your video monitor to an AC outlet and turn it on.

Refer to Pictorial 2-3 while you perform the following steps.

(✓) Press the ejection bar on the front of the disk drive(s). Then carefully remove the insert (if any) from the drive (s). Save the insert(s) for reinstallation when you transport the Computer. Do not install a disk in the drive(s) yet.

(✓) Connect the Computer's line cord to an AC outlet.

(✓) Push the power switch **IN** to turn the Computer on. The power supply fan should operate, the power LED on the front of the Computer should light, and the speaker should beep. You should see the following error messages on the screen after your video monitor has been correctly adjusted. (The battery message may not always appear.)

```
+++ERROR: Please replace the back-up battery!+++
+++ERROR: Bad configuration information found in CMOS!+++

— Errors found! Please press <Esc> to continue —
```

NOTES:

1. These error messages indicate that the back-up battery was not previously installed (or should be replaced). They also indicate that no data from the Setup menu is present in memory (you have not completed this menu yet).
2. If you see a different error message, it will provide clues to where the problem is located. Write down any "U" numbers that appear, such as "U101". Turn the Computer power off and carefully check the installation of each board. Then turn the power back on.

3. If you still do not get the proper error message, or if you get an error or failure message during the remaining tests, refer to the servicing section of the "Owner's Manual".

4. If the monitor screen is blank, check the video cable and the installation and configuration of the video board. (Refer to your "Owner's Manual".)

(✓) Press the ESC key; the Setup menu will appear on the screen. Update the menu to match the current hardware configuration of your Computer. Start by entering the time in 24-hour format (such as 11:31:25), without the colons, and then press ENTER/RETURN.

(✓) Enter the date by month/day/year such as 06/12/1990, without the /'s and with all four year digits, and then press ENTER/RETURN.

NOTE: In the following steps, the Setup Menu will move to the next part of the display after you press ENTER/RETURN. If you wish to select a portion of the display other than the one that is presently selected, use the arrow keys. Use the space bar to make the selection change. (Be sure the Num Lock indicator is off when you use these keys.)

(✓) **Main RAM:** This section is divided into the following subsections:

Base – This is the main memory of the computer and it can be set to 256K, 512K, or 640K (if you set the base memory to 256K or 512K, the EMS column will automatically increase). For now, set the base memory to 640K. Then press ENTER/RETURN.

Extended – If you have not added any SIMMs to the main board, this section will indicate 0K. Press ENTER/RETURN.

If, for example, you have added two 1M SIMMs in main board sockets MM505 and MM506, you will see 2048K in this section. If you press the space bar, you will see 0K, 1024K, and 2048K. Refer to your Owner's Manual and your software manuals to determine how the software uses extended or EMS memory. Then divide the memory between the extended and EMS sections as required.

EMS – If you have the standard 1M of memory, you should have 288K in this section (unless you are using an optional video card, which will allow this section to increase to 320K). When you press the space bar, the number will change from 288K (or 320K) to 0K. For now, set the EMS memory to 288K (or 320K). Then press ENTER/RETURN.

(✓) **Add-on-RAM:** If you add optional memory cards, beyond the 8M capability of the SIMMs on the main board, the add-on memory is indicated in this section. At this time, Base should indicate 0K and Extended should indicate 0K. Press the ENTER/RETURN key **twice** to pass through this section.

(✓) **Operating speed:** Select the "fast" option, which uses 0 wait states for CPU, memory, and I/O operation. Then press ENTER/RETURN.

NOTE: If you select the "slow" option, the Computer will run at the 6 MHz or 8 MHz AT speed (depending upon which paddle card you installed) with 1 wait state, which may be required to run some "protected" disk programs. If you select the "smart" option, the Computer runs with 0 wait states for memory operation and 1 wait state for I/O operation test. The following chart shows you how each selection operates:

80286	80386SX	OPERATING SPEED
12 MHz CPU & I/O	16 MHz CPU & I/O	Fast
6 MHz CPU & I/O	8 MHz CPU & I/O	Slow
12 MHz CPU 6 MHz I/O	16 MHz CPU 8 MHz I/O	Smart

(✓) **Serial Port 1 (COM 1):** Use the space bar to select "Enable". Then press ENTER/RETURN.

(✓) **Serial Port 2 (COM 2):** Use the space bar to select "Enable". Then press ENTER/RETURN.

(✓) **Parallel Port Assignment:** Use the space bar to select "LPT1:". Then press ENTER/RETURN.

(✓) **Password Control:** The password control section is explained in your Owner's Manual. **Do not enter a password at this time.** Press the down arrow key once and then the left arrow key to select "Video Display".

(✓) **Video Display:** If you are using a VGA monitor, select "System Board VGA". If you have installed an optional video card, such as the Model HVB-550, select "Ext. Enhanced Video" and then press ENTER/RETURN.

(✓) **Video Refresh Rate:** Select "60 Hz" to minimize display flicker and then press ENTER/RETURN.

(✓) **Boot Drive:** Use the space bar to select "Enter MFM-200 Monitor". Then press ENTER/RETURN.

(✓) **Floppy Drive 0:** A single 3-1/2", 1.4M disk drive is supplied with your kit as the standard drive 0. If you have installed a second floppy drive, however, the drive in the top position of the chassis would be floppy drive 0. Use the space bar to select the proper drive, as necessary. Then press ENTER/RETURN.

(✓) **Floppy Drive 1:** If you installed a second floppy disk drive, use the space bar to select a 3-1/2", 1.4M disk drive. If you have not installed a second floppy drive, leave this set to "– Not Present –". Then press ENTER/RETURN.

(✓) **Hard Disk Drive 0:** Select "Drive Type 44" if you have installed the optional Model HWD-4011 Winchester. If you have not installed an optional Winchester drive, "– Not Present –" will be the only possible indication. Then press ENTER/RETURN.

(✓) **Hard Disk Drive 1:** Select "Not Present".

(✓) The Setup menu should be correct for this point. Press ESC, then Y(for yes), and then ENTER/RETURN to save the changes you have made. After several seconds (could be up to 3 minutes if you installed a new Winchester) the Monitor program prompt should appear on the screen:

```
MFM-200 Monitor Version X.X
memory Size XXXK
Enter "?" for help.
-->
```

The Xs will be some number representing the version of the Monitor program and the size of available memory.

(✓) Type in the word TEST and then press ENTER/RETURN to enter the ROM-based diagnostics routine. The test menu should then appear on the screen.

NOTE: When a number key is called for in the following steps, use one of the number keys at the top of the keyboard. Do not use the number keys on the right side of the keyboard, as they are not recognized during these tests.

(✓) Press the 5 key to start the Power-up Test. A counter should begin to count up in the center of the screen. Allow the count to reach 20 or more; then press ESC to end the test. Press ESC again to return to the test menu.

(✓) Press the 4 key to start the Expansion Memory Test. A counter should again appear if expansion memory is installed. Allow the counter to reach at least 5 before you press ESC to end the test. Press ESC again to return to the test menu. This test may take several minutes to complete each pass. If memory expansion is not present, a message to that effect will appear on the screen. Press ESC to return to the test menu.

(✓) Press the 3 key to start the Base Memory Test. A counter should appear on the screen and the speaker should beep about every second during most of the test, with a double beep after each pass through one section of memory. Near the end of each pass, the screen should display various test patterns. Press ESC to end the test. Press ESC again to return to the test menu.

NOTE: This test takes several minutes for each pass. Allow it to complete at least five passes, taking about 20 minutes, before you end the test. During this time, you may want to review the "Owner's Manual" to learn more about your Computer's operation.

☑ Press the 2 key to start the Keyboard Test. Press each key and valid combination of keys (such as shifted or uppercase keys) to see if they display properly and fill the screen. If you press a key that represents a nondisplayable character (such as F1), only the character code will be displayed in the upper right corner of the screen. Keys that modify the action of another key, such as CTRL or SHIFT, will do nothing unless you press a second key while you hold down the first key. Press ESC to return to the test menu.

DISK-BASED DIAGNOSTICS

☑ If the test menu is not already on the screen, press the ESC key until you obtain it. NOTE: If drive A is a 5-1/4" floppy drive, you will have to perform steps 1 through 4 to access the diagnostics utility. If drive A is a 3-1/2" floppy drive, skip these four steps.

☑ 1. Simultaneously press ALT, CTRL, and INS and then release them to obtain the monitor prompt.

☑ 2. Type BF1 and press ENTER/RETURN.

☑ 3. When the **+++ Disk Error: Drive not ready! +++** error message appears, press the ESC key.

☑ 4. When the Monitor program prompt appears, type TEST.

☑ Locate the box marked "Disk-Based Diagnostics", open it, and remove the end user license agreement. Read, sign, and date the form, and then mail it.

☑ Locate the protective envelope containing the diagnostics disk and read the instructions on the back of the envelope. Then insert the disk into drive A (or the top-most 3-1/2" drive, if you installed a 5-1/4" drive in position A) so the label side is up and toward you, as shown in Pictorial 2-4.

☑ Press the 1 key to start the Disk Read Test. The drive should access and the drive's LED should light. A counter should appear in the center of the screen as before. Allow the count to reach 50 or higher before you press ESC to end the test. Then press ESC again to return to the test menu.

☑ Press the 6 key. You should see the Monitor program prompt (–>).

☑ Refer to Pictorial 2-5 to identify the drives. Then type either BF0 or BF1, depending upon which drive has the diagnostics disk, and press ENTER/RETURN to "boot" the Disk-Based Diagnostics disk. The screen should display a title block and restricted rights legend. Also note that "Auto-Configuration" is highlighted.

NOTE: If you get an I/O or disk error message, it is likely that your disk is damaged and cannot be booted. You can make this assumption since the disk read test proved that the Computer itself can read a disk.

☑ Press ENTER/RETURN to begin the diagnostics. The drive that contains the diagnostics disk will operate for a few minutes while the Computer determines several things about itself.

NOTE: After the self-checks, the Computer will briefly display a list of the diagnostic tests. Each of these tests will display information about your Computer and give you three options: accepting the results of the tests, re-running the self checks, or deleting the test.

☑ The first test the program runs is the AT CPU diagnostics. This test shows you which paddle card you have installed in your Computer and whether or not the optional numeric coprocessor is installed. Press ENTER/RETURN to accept the results of this test.

☑ The RAM diagnostic test shows you how much memory is installed in your Computer. Press ENTER/RETURN to accept the results of this test.

☑ The serial port diagnostic shows you what ports your Computer has available. Press ENTER/RETURN to accept the results of the test.

☑ The parallel port diagnostic provides you with information about your Computer's parallel port. Press ENTER/RETURN to accept the results of the test.

☑ The display diagnostic shows you how your video hardware is configured. Press ENTER/RETURN to accept the results of the test.

☑ The mouse diagnostic provides you with information about an external mouse. Since no mouse is connected to the Computer at this time, "Auto-Configure" will be highlighted. Press ENTER/RETURN to rerun the mouse diagnostic. Ignore the message that tells you to move the mouse. After a few seconds, "Delete" will be highlighted. Press ENTER/RETURN to delete this test. NOTE: If you connect a mouse to your Computer at some later time, rerun the diagnostics and add this test.

☑ The AT keyboard diagnostic shows you what type of keyboard is connected to your Computer. Press ENTER/RETURN to accept the results of the test.

☑ The floppy diagnostic shows you ~~what~~ the kind of disk drive(s) ~~is~~ installed in your Computer. Press ENTER/RETURN to accept the results of the test.

☑ The hard disk drive diagnostic shows what kind of hard disk drive, if any, is installed in your Computer. At this time, use the arrow keys to highlight "Delete" to indicate that a hard disk drive is not present or has not yet been prepped. Press ENTER/RETURN to delete this test. NOTE: Run this test again if you add a hard disk drive or after you prep the existing drive.

☑ This Computer does not support an SCSI hard drive, so press ENTER/RETURN to delete this test.

☑ This Computer does not support an EISA ROM, so press the ENTER/RETURN key to delete this test.

☑ The sync/async diagnostic shows you how the parallel port is configured. Press ENTER/RETURN to delete this test.

☑ Press ENTER/RETURN to delete the disk utilities test.

☑ Use the arrow keys to select "Normal" and press ENTER/RETURN.

☑ At this time "All Automatic Tests" will be highlighted. Press ENTER/RETURN to start the tests.

☑ When the diagnostic tests have finished and "All Tests Complete No Errors Found" appears, press END.

☑ Use the arrow keys to select "Exit" and press ENTER/RETURN. Then press the END key to exit the diagnostics.

☑ Press and hold the CTRL, ALT, and ~~DEL~~ INS keys in sequence, and then release them, to return to the Monitor program prompt.

☑ Press the ejection button on the front of the disk drive to remove the diagnostics disk. Then store the disk in a safe place.

If you do not have a Winchester drive, turn your Computer off and proceed to "Test Summary" on Page 3-6. If you do have a Winchester drive, proceed to "Winchester Drive Preparation and Tests".

WINCHESTER DRIVE AND TESTS

☑ Locate your MS-DOS disks.

☑ Press and hold the CTRL, ALT, and ~~DEL~~ INS keys in sequence, and then release them, to return to the Monitor program prompt (–>).

☑ Refer to Chapter 1 in your Owner's Manual and make a copy of each MS-DOS disk. You will use these disks for the Winchester tests.

☑ Insert the copy of MS-DOS distribution disk #1 into the floppy disk drive and boot the disk. To do this, type either BF0 or BF1 and then press ENTER/RETURN when the Monitor space program prompt appears.

☑ When the screen asks if you wish to proceed with SELECT, press the N key (for no).

NOTES:

1. The "PREP" utility that you will run in the next step can take several hours to complete, depending upon the storage capacity of the drive. The entire disk will be written to and read from several times to identify any questionable areas on it. During this routine, "bad sectors" are located ~~and~~ ~~so~~ ok that the drive will avoid them. It is normal for several bad sectors to be located, especially on a large-capacity drive. delete "and"

2. You have not written anything to your Winchester drive yet, so you may ignore the PREP utility warnings.

3. The PREP utility uses the drive type information in the Setup menu table. If the drive type in the Setup menu is incorrect, the PREP utility will not be able to prepare the disk surface, test it, or write the bad sector table to the drive.

(✓) Remove the copy of disk #1 from the drive and install disk #2.

(✓) Perform the PREP utility in the Winchester drive by typing PREP and then pressing ENTER/RETURN. When the message "Do you want to proceed with PREP (Y/N)?" appears, type Y.

(✓) When the line: "Hard disk drive unit number (0 - 7)" appears, type 0.

(✓) When the line: "Type P to proceed with drive unit" appears, type P. The power LED will light orange/red and remain on until the tests are complete. In addition, "--- Operation Complete, Press any Key to Exit to the Monitor --- " will be displayed. when this test is completed.

(✓) After the 4th Media routine completes and "Press any key to continue" appears on the screen, press any key to display the Monitor program prompt. Then remove the MS-DOS disk from the drive and reinstall the diagnostics disk.

(✓) Reboot the diagnostics disk. To do this, press and hold CTRL, ALT, and INS in sequence to display the Monitor program prompt. Type either BF0 or BF1 and press ENTER/RETURN.

(✓) When you see the Restricted Rights Legend, use the arrow keys to move the reverse video cursor from "Fast Test" to "Auto-Configuration" and press ENTER/RETURN.

NOTE: After the self-checks are complete and you have accepted the results, the Computer will again display a list of the diagnostic tests. As before, each of these tests will display information about your Computer and give you three options: accepting the results of the tests, re-running the self tests, or deleting the test. Re-run the disk-based diagnostic tests, but this time when you get to the hard disk drive diagnostic, accept the results of the test.

(✓) When you see the Restricted Rights Legend, use the arrow keys to move the reverse video cursor from "Fast Test" to "Normal Mode" and press ENTER/RETURN.

(✓) When you see the Diagnostic Test Menu, use the arrow keys to move the reverse video cursor from "All Automatic Tests" to "Single Test" and press ENTER/RETURN.

(✓) Use the arrow keys to move the reverse video cursor to "Hard Disk Drive Diagnostic" and press ENTER/RETURN.

(✓) When you see the Hard Disk Drive Diagnostic Section Menu ("All Automatic Sections" should be in reverse video), press ENTER/RETURN.

(✓) When you see the "All Tests Complete" message on the screen, press the END key to return to the Hard Disk Drive Diagnostic Section Menu. Then use the arrow keys to move the reverse video cursor from "All Automatic Tests" to "Exit" and press ENTER/RETURN.

(✓) When you see the Diagnostic Test menu, use the arrow keys to move the reverse video cursor from "Single Test" to "Exit" and press ENTER/RETURN.

(✓) When you see the Restricted Rights Legend, press the ejection bar on the disk drive and remove the diagnostics disk. Put the diagnostics disk away for safekeeping.

NOTE: Eventually you will have to reboot your MS-DOS operating system disk and generate more working disks. We strongly recommend that you do this by following the procedure in the Owner's Manual. By doing this, you will develop a set of MS-DOS working disks that are configured for the way you use your Computer.

When you have configured your working disks, you can simply copy these disks to your Winchester drive and you will not have to go through the Select process again. Your working disks will serve as a backup for this exact configuration.

TEST SUMMARY

NOTE: You will need from three to four 720K blank disks to complete the following steps.

Although your Computer is supplied with a high density, 1.4M floppy disk drive, your MS-DOS operating system and Disk-Based Diagnostics are supplied on low density 720K disks. Since the following MS-DOS "Install" procedure uses the DOS "Diskcopy" program (which only recognizes the same type of media; e.g. 720K to 720K or 1.4M to 1.4M), we suggest that you use only 720K disks when you perform the following steps.

(☑) Press and hold CTRL, ALT, and INS in sequence to obtain the Monitor program prompt.

(☑) Locate your MS-DOS documentation and make sure you have signed and returned the licensing agreement before you use the software.

(☑) Insert MS-DOS distribution disk #1 into a 3-1/2" floppy drive.

(☑) Type either BF0 or BF1 and then press ENTER/RETURN to boot the distribution disk.

(☑) At the screen prompt, enter the Date and Time, if necessary.

(☑) At the screen prompt "Proceed With Select (Y/N)?", press Y to run the Select program.

(☑) At the screen prompt "Do You Want To Back Up Your Distribution Disks Now (Y/N)?", press Y.

(☑) Continue to use the Select program until you have made backup copies of your MS-DOS disks. When you reach the "Main Drive Selection Menu", select "(C) Prepare hard disk drive(s) [menu]" if you have installed an optional Winchester drive in your Computer. The remaining menus will prompt you on how to format the Winchester and copy the MS-DOS distribution disks onto the Winchester drive.

(☑) Press C when "Prepare Hard Drive C:" appears on the screen.

(☑) Follow the screen messages from this point through copying all of your MS-DOS disks.

(☑) When you have completed the Select program, store all of your supplied distribution disks safely away and use the newly-created working disks.

NOTE: If you need to copy data from a 720K disk to a 1.4M disk, or vice versa, use the following procedure:

1. Create a bootable disk using the following Format command:

   For a 1.4M disk, type: FORMAT A:/S

   For a 720K disk, type: FORMAT A:/S/N:9/T:80

   NOTE: Refer to your MS-DOS Manual under "Format" for more information.

2. Use the Copy command to copy data from one disk to another. NOTE: With a single floppy drive, this can take some time, depending upon the number of files to be copied. You can speed this process by using the XCOPY command (refer to your MS-DOS Manual).

(☑) Turn the Computer off, if this has not already been done.

NOTE: You must wait at least 20 seconds after you turn the Computer off before you turn it back on. The power supply capacity is such that it takes 20 seconds for all voltages to drop low enough to ensure that a power-on reset will occur when power is reapplied.

Be sure to store the diagnostic disk in a safe place. We recommend that you always remove floppy disks from the disk drives before you turn the Computer off or on. This prevents the disks from becoming damaged during power-up or power-down.

Since all of the major parts of your Computer were factory-assembled and tested, and carefully packed before shipment, you should not need the rest of the disk-based diagnostics at this time. If you ever suspect that your Computer is not working properly, run the fast tests first; then refer to the Disk-Based Diagnostics Manual, if necessary, for more information about isolating a problem in the Computer. Tests identified with an "A" are automatic tests, while tests identified with an "M" are manual tests and are not part of the fast, or automatic, tests.

In some cases, a problem may provide you with some clues to where it is. If you suspect that there is some sort of problem related to writing or reading a floppy disk, for example, you know you should test the floppy disk drives and the floppy disk section of the drive controller board more thoroughly than the fast (automatic) tests do.

If you ever see an error message on the screen, note the exact message carefully; it usually contains clues to the problem. If you need assistance in solving a particular problem, be sure to provide information as to which test produced the error message, what the error message was, and the configuration of your Computer (which options you have, etc.).

If you install optional drives or cards, repeat the Diagnostic Tests after you install each option. This will ensure that the Computer operates properly with the new option. You may also need to reconfigure the diagnostics for each hardware option that you install.

This completes the "Diagnostic Tests". Proceed to "Final Assembly".

FINAL ASSEMBLY

Refer to Pictorial 3-1 while you perform the following steps.

☑ Place a soft cloth on your work surface to help protect the cover and front bezel from scratches.

☐ ~~Refer to Detail 3-1A and position the stud on the model nameplate into its hole in the front bezel. It does not matter at this time how the printing on the nameplate is positioned. Set the front bezel down on your work surface so it holds the nameplate in position.~~

☐ ~~Place the coil spring onto the stud of the nameplate and then push the nameplate retainer as far as possible into the nameplate. The spring allows you to easily reposition the nameplate so the printing is right-side up when the Computer is in its normal operating position.~~

☑ If you Computer does not have a second floppy disk drive, refer to Detail 3-1A and use a #6 x 3/8" self-tapping screw to mount the 5-1/4" drive cover to the inside of the front bezel as shown. If your Computer does have a second disk drive, set the 5-1/4" drive cover aside, it will not be needed.

☑ Position the cover onto the front bezel. Make sure all five plastic studs are in their corresponding holes in the cover. Then start six #6 x 3/8" self-tapping screws into the mounting holes. After you have started all six screws, tighten them snugly. **Do not** overtighten them, or you may strip the threads in the plastic bosses.

Refer to Pictorial 3-2 while you perform the following steps.

☑ Be sure the Computer power switch is in the off (out) position and disconnect the line cord, monitor cable, and keyboard cable, if this has not already been done.

☑ Refer to Detail 3-2A and use a 6-32 x 1/4" screw to mount a cover plate onto the rear panel at each unused backplane board slot. Be sure the tab on one end of each plate enters its respective slot near the rear of the chassis partition.

☑ Carefully peel away the backing paper from the warning/ID label. Then press the label onto the rear panel in the area shown.

☑ Carefully peel away the backing paper from the blue and white label. Then press the label onto the rear panel in the area shown. Refer to the numbers on this label in any communications you may have with the Heath Company about your kit.

Refer to Pictorial 3-3 while you perform the following steps.

☑ Position the chassis so its front is toward you as shown.

☑ Hold the cover so that the front is toward you and the rear is positioned over and behind the front of the chassis, as shown.

☑ Carefully slide the cover toward the rear of the chassis while you make sure that the bottom cover flanges are under the chassis bottom.

☑ Make sure the LED enters the slot in the front bezel while you slide the cover all the way toward the rear of the chassis.

☑ Use two 6-32 thumb screws to secure the cover to the rear of the chassis.

☑ If you will use your computer in a vertical position (and you did not install the feet on the bottom), carefully peel away the packing paper from the four feet and press them onto the left side of the cover.

Refer to Pictorial 3-4 while you perform the following steps.

( ) Be sure the keyboard's AT/XT switch is in the AT position, as shown in the inset drawing.

( ) Carefully peel away the backing paper from the keyboard label. Then press the label into the recessed area near the upper left corner of the keyboard.

NOTE: If you wish, you can use the icon labels supplied with the kit to identify your cables and the connectors on the rear panel (see Pictorial 3-5).

This completes the "Final Assembly" of your Computer. Refer to the information in the Owner's Manual for information about the operation and maintenance of your Computer.

SPECIAL SHIPPING INSTRUCTIONS

If you ever need to ship your Computer to the factory for repair, back up the data on the Winchester drive and then run the SHIP utility.

If only a board or disk drive fails, return only the board or drive that failed. Do not return the entire Computer. Refer to "Customer Service" on the inside rear cover of this Manual.

Whenever you return your Computer (or any part of it) for service, be sure to include an exact description of the system configuration and jumper settings, along with a detailed description of any error messages and symptoms your Computer exhibited. This information will help the service technician locate and correct the problem quickly.